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Appreciations Through Biology

ALFRED F. NIXON
Dunbar High School, Washington, D. C.

In general our educational program has placed more emphasis on production than on consumption. It has been generally felt that a high correlation existed between the ability to produce art and literature and ability to judge (an index to appreciation), but a study made by Speer shows that this supposition is not well founded. He says, "The two capacities, while they go together positively in some measure, do not do so in any considerable degree."[1] This, however, does not mean that production should be eliminated, but that more attention should be devoted to training in consumption.

Our school population, for the most part, will be in the consumer class. Newspapers, magazines, books, works of art, radio, movies, and the like are intended for a consumer population. Art, literature, and social studies training all help in preparing the public for this consumption, but they are not sufficient. Science must be brought into the training with sufficient strength to balance and direct the many emotions stirred by the former three fields. Science taught in isolation from these fields will not carry over sufficiently to them. All must be brought together in the teaching process. This means that the teacher should be acquainted with at least the fundamentals of these various fields. In the words of Suzzallo, "The teacher should be liberally educated in all the arts and sciences. He does not need to 'know it all' but to appreciate it all."[2] By bringing art, literature, and social studies into the science classroom and bringing science into classrooms of art, literature and the social studies a desirable correlation may be developed. The extent to which this can be done depends upon the training and "hot interest" of the teacher.

Mohler,[3] in the process of teaching music from an appreciation basis, pro-

[1] Robert K. Speer, *Measurement of Appreciation in Poetry, Prose, and Art and Studies in Appreciation*, p. 71.

[2] Henry Suzzallo, "A Program for Tomorrow," *National Education Association Journal*, Vol. 70, p. 627.

[3] Louis Mohler, *Teaching Music from an Appreciation Basis.*

ceeds on the assumption that associating music with the story or text makes for greater music appreciation. Along a similar line of reasoning, it may well be that associating biology or science in general with art, literature, and social studies enhances not only the appreciation of the biology or science, but also that of the fields with which they are associated. The reading of Huxley's *Essay on a Piece of Chalk* in the English class would have far greater meaning for and afford greater enjoyment to the student who has a previous knowledge of the biological forms involved. This biological knowledge would serve as a factor in the "recognition of merit" in Huxley's work.

Dykema says, "The fact that our children in the schools are today surrounded by music, to an extent never before equalled, is no guaranty that they prize it more than did the children of an earlier generation. Not all eyes see with understanding; nor do all ears hear with enjoyment. The student in the art gallery is seldom a discriminating critic. The usher in the concert hall frequently prefers to pass his time, not in listening to the music, but in idling in the corridor."[4]

The writer ventures to say that many an usher who would idle in the halls during the rendition of Rimsky-Korsakov's *The Flight of the Bumblebee* had not heard it played and discussed in a biology class in connection with the study of insects. In the absence of musical training, this type of experience would serve as a basis for some degree of appreciation and would enhance that of an individual with a musical background. Based upon years of experience, Mohler thinks of appreciation as "the glow of pleasure which comes from having recognized, if not discovered, some embodiment of beauty in an art product."[5] "Glows of pleasure" can be promised the pupil by providing him with experience in connection with his science which he might have otherwise missed.

Dykema believes that appreciation may be passive, intermediate, and active; that each is determined by the extent of cooperation of the individual, and that this extent of cooperation is determined by the individual's contacts with life. In other words, the more we bring to music the more music has to give us. In the writer's opinion, it is just this type of reciprocity that exists in all types of appreciation. These three degrees of appreciation all have their place in our lives, but he feels, as does Dykema, that active appreciation is the chief concern of our schools. It involves not necessarily production, but ability to consume (listen attentively and thoughtfully in the case of music appreciation). Where production is achieved by the student it is to be used as a means of interpretation or expression most suitable for a particular child in reaction to what was being taught. In response to the teaching of a unit in biology, one student might express himself in a poem, another in a panorama, another in a series of drawings, music, a series of questions, a skit, and so on. Now it must be kept in mind that generally these productions or expressions are not the primary aims of the unit, but they might be used by the teacher as one means of determining what the unit has meant for the child. The teacher should encourage students to express themselves in one way or another, but must not become impatient with the child who fails to do so. Rather he must question himself and his methods of procedure. These expressions should be for the most part in-

[4] Peter W. Dykema, See Foreword to *Teaching Music from an Appreciation Basis*, by Mohler, p. 12.

[5] Mohler, *op. cit.*, pp. 14–15.

dividual, although opportunities should be provided for group activities.

In 1932 a study made by Maxwell[6] was published under the title, *Cultural Natural Science for the Junior High School*. By making a study of eighteen sources dealing with the major objectives of public education, Maxwell classified these objectives under five headings: Health Habits, Social Duties, Vocational Duties, Diversions, and Self-regimentation Activities. In the eighteen sources analyzed twenty statements of objectives belonging in the category of Diversions were found. In addition, 178 out of 190 teachers, who replied to a questionnaire sent out by the investigator, expressed the belief that "diversions or avocations are important objectives of general science." He then defined the "specific objectives of cultural-natural science education" as "growths in desire and ability to achieve pleasant and wholesome diversions through the appreciation of natural-science themes." By a series of carefully planned steps Maxwell arrived at a final test of 108 themes. He next prepared a learning manual for each of four themes. These manuals were then tried out and evaluated by the students. Teachers were given data blanks to be filled out at the close of the tryout. These blanks contained certain important information concerning each participating pupil. The results showed the manuals "to be effective in increasing pupil interests in science themes; to be preferred by pupils to the conventional type of general science course; to be more effective than the conventional type of general-science course."

This study lends some support to the writer's contentions that there should be some divergence from the conventional method of science teaching as a means of stimulating and maintaining interest; and that the appreciation of science may be enhanced by its correlation with art (*painting, photographs, models, making booklets*), literature (*reading, writing, debating, staging plays, figures of speech*), and social studies (*allusions to human experience, trips*).

Croxton[7] aiming to arouse interest in plants, to give a "mind set" for the study of botany, to aid pupils to analyze life situations, to afford practice in reflective thinking, and to correlate botany with English and physiology included among his procedures certain poems to be read. Pupils were then asked to state the meaning of the poem after which class discussion followed. They would read aloud passages they did not understand and the teacher would attempt to explain them if no other member of the class was able to do so. The teacher would ask the meaning of passages relating to plant life. A few passages and poems taken from Croxton's lesson plan are:

"When Daffodils Begin to Peer" from the *Winter's Tale*—Shakespeare.

"Spring" from *In Memoriam*—Tennyson.

"When the Hounds of Spring" chorus from *Atlanta in Calydon*—Swinburne.

"June" from the prelude to *The Vision of Sir Launfal*—Lowell.

"Trees"—Kilmer.

"A Ballad of the Trees and the Master"—Lanier.

In view of careful study of the subject, it would seem that appreciation involves both intellectual and emotional elements. It is a sensitive awareness to and perception of the importance or utility of information in its relation to other fields and in the development of attitudes and tastes. The use of many

[6] Paul Ammon Maxwell, *Cultural Natural Science for the Junior High School.*

[7] W. C. Croxton, "Botany," *The Planning of Teaching.* University of Illinois Bulletin, Walter S. Monroe, editor.

and varied techniques is conducive to the development of appreciation. The writer suggests the following example of how a teacher of biology might develop appreciation in connection with the teaching of wheat-rust.

1. Study stages in life-cycle by use of actual specimens, microscope, lantern slides, charts, text-books, and any other conventional method, or device.

2. Direct the pupils' attention to *The Gleaners*, a wonderful masterpiece by Jean Francois Millet. This picture shows three poor women gathering a few ears of wheat left behind by the laboring harvesters who amid loaded wagons and huge stocks of sheaves continue to harvest an abundant crop. Allow the pupils to observe the picture carefully and to discuss it among themselves.

3. Begin to question along the following lines:

a. What do you think would be a good title for this picture? Some pupils may know the correct title. Try to hold it in abeyance until other titles are suggested. After some discussion, arrive at or give the correct title. Explain that it is a masterpiece, the original of which is in The Louvre.

b. Why is it called *The Gleaners?*

c. What type of topography is shown?

d. Where is such topography generally found in our country?

e. What are some crops usually grown on plains or prairies?

f. What do you think is being harvested?

g. How would a harvesting scene of today differ from the one shown in the picture?

h. What do you think the women intend to do with the stalks of grain they are gathering?

i. What is meant by "stubble"? Can you observe any in the picture?

j. What dangerous plant foe might be lurking in the stubble?

k. What might these people do to help exterminate it?

l. Do you think that a strain of wheat immune to wheat rust had been developed when this picture was painted?

m. What animals are destructive to grain crops?

n. What evidence is there in the picture that these people are not harvesting their own crop?

o. What interesting coincidence exists between the painter's name (Millet) and the name of a close relative of wheat (millet)? The teacher must be careful to point out the difference in pronunciation of these names.

4. After the discussions based upon the preceding type of questioning, other works of Millet having biological significance might be mentioned. Some examples are: *The Angelus, The Sower, Autumn, The Shepherdess,* and *The New-Born Calf.*

5. Mention the fact that many great artists and writers have been stimulated by the biological. Some examples are: Rosa Bonheur, John James Audubon, Anna Curtis Chandler, Paul Bransom, and Helen Dean Fish, Walt Disney and others.

6. Suggest that pupils make attempts at expressing themselves.

7. Allow them to exhibit their expressions if in form of drawings, paintings, or models; or to read them if in form of short essays or poems. Below is a pupil's poem which resulted from the study of one of our greatest pests to grain crops.

The plan outlined above includes techniques and materials conducive to:

a. An increase of knowledge;

b. The critical evaluation of knowledge;

c. Facilitating the gaining of knowledge and making it pleasurable;

THE GRASSHOPPER

The grasshopper is a harmful insect
Because of its color it is hard to detect
Into three general parts is its body divided
Head, thorax, and abdomen are amply provided.

On its head are the eyes and a pair of antenna
Mouth parts which easily supply it with dinner
The antennae are used for smell and for touch
The mouth spits molasses if held in one's clutch.

On its thorax, six legs and two pairs of wings
With the latter it flies, with the former it springs.
Its abundance of energy has made it quite greedy.
It destroys man's food that should nourish the needy.

Tympania for hearing are on its abdomen,
And spiracles for breathing, with tiny hairs therein
Oh, that it would rest in some cozy nest,
'Til scientists found ways to get rid of the pest.

—Mary Allen

d. Giving the pupil an opportunity and a desire to apply his knowledge in varied situations;

e. Giving the pupil an opportunity and the desire to express himself and to evaluate his expressions and those of others.

At the present time the techniques generally used are those that are conducive to the attainment of knowledge and thus a limited degree of appreciation. We must continue to use and improve these knowledge-aim techniques, but we must also search for and use those techniques which will make for the realization of other important objectives. Above all we must not fail to recognize the importance of an enthusiastic, dynamic teacher.

The present investigator agrees with those educators who suggest that exposure to standards accepted as good in science, art, literature and other fields is conducive to the development of appreciation. But exposure to these things are often unpleasant to the child and even to the adult. The adult has developed sufficient will power, stability, and reasoning to force himself to acquiesce to these exposures in the tacit belief that appreciation will come. To the child these exposures should be made interesting and enjoyable.

BY THE WAY

A LARGE TEA STRAINER attached to a suitable handle is a very useful gadget for collection of water organisms and also in connection with a large aquarium. The tea strainer may be purchased at the five-and-ten and the handle attached by some interested pupil who has access to the industrial arts laboratory, or who has a few tools at home. An old broomstick or a short length of bamboo pole is a good handle.

INSULIN BOTTLES, which may often be obtained from an interested physician or from a hospital, make unusually durable containers for a collection of the smaller types of seeds, such as grasses.

IF YOUR AQUARIUM gets overgrown with green algae during the sunshiny days of the fall, cover it for a few days with newspapers, thus cutting down the sunlight.

Ecology—Hub of the Pure and Applied Natural Sciences

RALPH W. DEXTER
Kent State University, Kent, Ohio

There are no fish in Northbranch Creek. Once they were abundant, and Northbranch Creek was locally famous as a site for wholesome recreation. But why are there no fish there today? Why have many attempts to restock the stream failed? An investigation was begun to find the answer to these questions. A seining sample taken in that investigation showed that not only were game fish absent, but practically all forage fish were absent as well. Little wonder that black bass, perch, and pike were not present! If forage fish are gone, the absence of fish life cannot be due to overfishing. Bottom samples produced meager indications of animal life. Some of the water was strained, but it did not yield much plankton. Without small animal life and plankton there was little food for the forage fish and the young game fish. The invisible animal life feeds on tiny water plants, the algae; but algae were very scarce. Algae are green and need sunlight to manufacture food. But Northbranch Creek has changed: No longer is the water clear; now it runs muddy. Sunlight cannot penetrate the silt-laden water. So the investigation next turned on the origin of this sediment. Upstream it was found that drainage was carrying silt into the stream. The land was eroding; the topsoil was being washed away; gullies were forming. The land was losing its fertility and a desert was slowly taking shape. With every rain a torrent of muddy water washed over the land and spilled into the overburdened stream flooding the countryside. Now it was remembered that this barren waste had once been a dense forest—a favorite hunting ground of the early settlers. No one seemed to realize that when the forest was leveled, the game would disappear, rainwater would not soak into the ground, the soil would wash away, the stream would fluctuate between flood water and dry stream, the muddy water would not get enough sunshine for algae to live, there would be no small animal life to feed the forage fish, and game fish would vanish from the stream. It is a long chain from the fish to the forest, but there it can be traced, giving a fine illustration of the interrelationships of all natural resources.

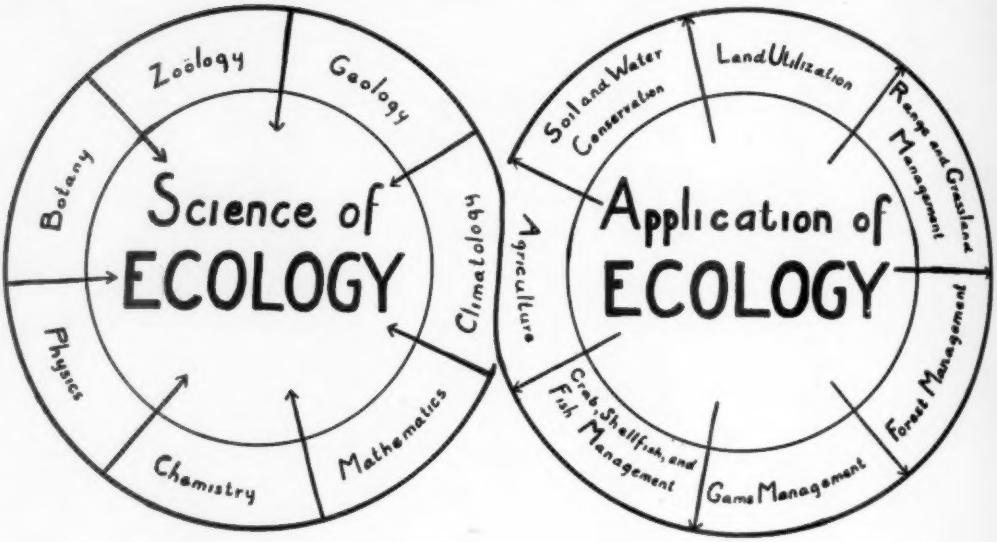
The study of these interrelationships of living things with each other and with their environment is the science of ecology. Ecology is at once analytical and synthetic in its approach. It analyzes a natural phenomenon such as the disappearance of fish from Northbranch Creek to determine the component factors responsible for a whole chain of events. Then the pieces are put together like those of a picture puzzle to make possible an understanding of the whole complex situation as a unit of nature.

Many basic sciences contribute foundation stones to the science of ecology. Through chemistry, analyses are made of soil and water to determine salt content, acidity, organic content. Instruments borrowed from the physics laboratory are used to measure temperature; water velocity and pressure; the quality,

intensity, and penetration of light. Mathematics contributes statistical methods, quantitative techniques of sampling populations, and the basis for surveying the landscape. Geology, through its branches of physiography and soil science, gives an understanding of soils—their structure, nature, and origin, and the forces which are acting upon them. Petrology and physical geology explain the nature of the bedrocks while historical geology traces the history of a region. Hydrography explores the physical and chemical properties of bodies of water. Climatology, another branch of the natural sciences, focuses attention on the relation of the atmosphere to living things on the earth. Descriptive climatology pictures atmospheric conditions in terms of precipitation, temperature relations, humidity, movements of air masses. Factors of macro- and micro-climates are measured and recorded. On and within these great masses of earth, water, and atmosphere live the plants and animals which are the concern of botany and zoology. The classification of these living organisms, their physiological requirements and adjustments, their structural adaptations to a manner of living, their behavior and diseases and their inherent characteristics are all special subsciences of biology. The synthesis of all—the living organisms, their coactions with each other, and their reactions to the physical surroundings—is the special province of ecology. The chief contribution which ecology makes to science is the integration of all basic sciences for the understanding of natural phenomena. Studies of food cycles, population numbers and their fluctuations, community dynamics, distribution of plants and animals and its causes weld together the fundamental sciences into a unified problem. Ecology borrows from all sciences, requires the cooperation of all scientists, and gives in return an overview concept of nature. Ecology is the hub of the natural sciences.

The application or the art of ecology is the very essence of what is called conservation. The management of aquatic resources—crabs, shrimps, shellfish, fish—depends upon a knowledge of the life histories of these organisms. Temperature and salinity tolerances; seasons and habitats required for propagation; the food, enemies, and parasites of each must be known for effective management. Likewise, the life histories of game animals, their cycles of abundance, their requirements for an optimum population which will be in harmony with other resources to insure a continued supply, must be the basis for a successful game management program. Forestry now recognizes the importance of the relation of a forest stand to other resources, and the need of providing for the forest's own perpetuation through selective cutting; the leaving of seed trees; reforestation; and the protection of the forest against the dangers of fire, erosion, and insect pests.

Determining the carrying capacity of range lands to insure maximum utilization without destroying the grasses and allowing the invasion of weeds is a common sense measure as well as an application of ecology. Enemies of pests must not be destroyed to prevent an outbreak of vermin; yet many range lands have been turned into deserts by rodents before the lesson was learned that carnivores are needed to keep the rodents in check. Land planning is based upon a knowledge of the physical nature of the landscape, soil and climate, and the requirements of various crops and domestic animals. Land not suitable for one use may be ideal for another, but many farmers have tried to eke out an



existence cultivating land which was better suited for use as a pasture or woodlot. The introduction of domestic animals into new areas is hazardous without a study of the climatic differences which the animals will have to endure, especially during the breeding season. Plant introductions have failed because of the lack of proper insects for pollination. The failure to introduce red clover into Australia without importing bees at the same time is a classic example. Pests introduced, on the other hand, such as the Japanese beetle, oriental fruit moth, Norway rat, or English sparrow, have demonstrated how an organism can get out of control in a new region in the absence of natural enemies and upset the balance of nature to an alarming degree. Control measures for insect pests involve a knowledge of the life history of the insect and its relations to the environment. The conservation of fertile topsoil and the maintenance of a uniform water cycle not only assure the preservation of the basic resources, but hold the key for managing all of the renewable resources.

The management and utilization of all natural resources is a matter of applying ecological knowledge, principles, and methods to the problems of maintaining and protecting a balance of nature favorable to the economic welfare of man.

MAJOR DENNIS R. WILLIAMS, Field Service Officer, Army Pictorial Service Signal Corps, has rejoined Encyclopaedia Britannica Films, Inc. as Educational Field Supervisor after serving four years in the Army in Film Utilization work in the United States and later throughout the world in Army Combat Training Centers.

Prior to entering the Army, Major Williams was District Manager for Erpi Classroom Films, Inc., which has been absorbed by Encyclopaedia Britannica Films, Inc. Major Williams will headquarter in Chicago at the film company's home office.

IT IS NOT TOO LATE to submit brief items for the *Visual Aids* special issue to the guest editor, Addison Lee, Austin High School, Austin, Texas. Since the issue is tentatively scheduled for April, such items should reach Mr. Lee before February 10.

Among the new developments of the Chicago meeting was a plan for a series of calendar pages for THE AMERICAN BIOLOGY TEACHER. The plan was in part an outgrowth of the Nature Calendar developed last year by Dr. Agersborg and sponsored by the Association.

The calendar page project was turned over to the Conservation Committee, headed by Dr. Palmer. Each issue will carry the calendar for the following month, since the journal is mailed about the fifteenth of the month of issue. In future issues, the space occupied by this announcement will be used for a photograph, drawing, map or other device appropriate to the season.

In the space for each day will be an item of biological interest; while in the present issue nearly all of these are birthdays, no doubt future issues will see the appearance of an increasing number of other types of items. Opposite each printed item will be a blank space in which the reader may make such notes as interest him—temperature and weather records, appearance and disappearance of migrant birds, personal appointments.

Please let the committee know what you think of this idea. Do you want it continued? Does it make the journal more useful? What suggestions have you for improvement. Send your comments to the chairman of the Conservation Committee, DR. E. LAURENCE PALMER, *Cornell University, Ithaca, New York.*

JANUARY 1946

1. Clarence Cottam, Wildlifer, born 1899		17. Theodore Frison, Naturalist, born 1895	
2. James Croll, Scientist, born 1821		18. Edward Franklin, Chemist, born 1825	
3. George W. Crary, Dermatologist, b. 1864		19. E. S. Burgess, Botanist, born 1855	
4. Louis de Morveau, Chemist, born 1737		20. H. M. Lefroy, Entomologist, b. 1877	
5. See note below.		21. Waldo Lee McAtee, Biologist, born 1883	
6. Gilbert M. Smith, Algologist, born 1885		22. Francis Bacon, Philosopher, b. 1561	
7. Johann C. Fabricius, Entomologist, b. 1745		23. Daniel W. Coquillett, Entomologist, b. 1856	
8. Alfred Russell Wallace, Naturalist, born 1823		24. Frederick Julius Cohn, Botanist, born 1828	
9. Frederick V. Coville, Botanist, died 1937		25. William McGillivray, Naturalist, born 1796	
10. Herbert William Conn, Bacteriologist, b. 1859		26. George F. Atkinson, Botanist, born 1854	
11. Aldo Leopold, Wildlifer, born 1887		27. William Crocker, Botanist, born 1876	
12. O. B. Howard, Mammalogist, b. 1863		28. John Merton Aldrich, Entomologist, b. 1866	
13. Sir Davis Ferrier, Neurologist, b. 1843		29. William Tufts Brigham, Museum Director, died 1926	
14. Edward F. Bigelow, Nature Teacher, b. 1860		30. Franz Hauer, Geologist, born 1822	
15. Nathaniel Lord Britton, Botanist, born 1859		31. Harold C. Bryant, Park Naturalist, b. 1886	
16. Antonio Jose Cavanilles, Botanist, born 1745			

NOTE: For best suggestions for January 5, sent to E. Laurence Palmer, Cornell University, Ithaca, New York, a set of twelve different identification charts will be sent; for best suggestion for any date in remainder of the year, a complete twig chart. How many of the above can you identify?

A Won World

Since Wendell Willkie plead for his "one world" the war over leadership in that world has been won by us and our allies. The future is no one's responsibility if it is not ours. A future of happiness according to the average American's philosophy is one in which the rights of all will be recognized. This philosophy has its influence not only on the fate of nations but of states, of professions, of organizations, of industries as well as of members of our own home family groups. The rights of the individual must not be forgotten in considering the rights of all. In what ways do we as biology teachers and as members of The National Association of Biology Teachers fit into this picture?

No honest person can fail to recognize that this war has been won by the side best able to enlist the voluntary cooperation of groups with widely different viewpoints, interests and heritages. We know that the army worked with the navy, the navy with the air forces; these military groups with civilian labor and industry, and these with the long-haired research scientists. Everyone recognizes that one of the most potent of the final knockout punches was delivered by the research scientists' atom bomb. Unfortunately, current events hardly warrant us handing many bouquets to the politicians who at present seem in a fair way to start our world affairs on another twenty-year cycle that can lead only to another war. As teachers and moulders of opinion in this won world, a staggering responsibility rests on our shoulders—common sense dictates that to succeed we must cooperate with worthy elements without necessarily sacrificing our independence. It would seem that this theme best expresses the deliberations of *The Representative Assembly* of The National Association of Biology Teachers held in Chicago on October 13, 1945. It is this theme that will probably be adhered to unless through the democratic process a contrary view finds better support. It may not be the politically wise philosophy to follow but no one can honestly recognize it as obstructionist in nature or uncooperative to be independent.

A few decades ago a group of science educators advanced the idea that because *some* things in science could be developed satisfactorily by pressing a button and turning on a talking movie before a thousand youngsters at once, the need for individual instruction had passed. In part as a result, we now find many large school systems doing away with laboratories and with small classes and letting a few glib showmen take over the presentation of some of the highlights of science to thousands and calling the experience science.

To your writer, it seems that this is absurd. We venture the prediction that with the new dignity the war has brought to science much of the chaff that has been accepted as science will quickly be eliminated. While all true science is, as Huxley has said, little more than organized common sense it would seem as if much that has passed as science education or as precollege science has been little more than organized nonsense. In view of the demands of the times we must as teachers of biology go over our offerings again and again. We must keep alert to new developments. We must experiment with the groups we are teaching to learn what techniques are most effective in developing proper understandings and attitudes in *them.* We simply cannot expect that a satisfactory

meeting of our professional obligations can ever be effected by subjecting great numbers of students to stereotyped, standardized teaching techniques.

We have won the leadership of the world as a nation but we cannot demand that all the people of the earth talk, dress, eat, pray, work or play as do we. They would be no more happy trying to live our lives than would we should we have to live theirs. If we want to hold a place of leadership in world affairs we must recognize individual differences and give each group the opportunity to develop, along the lines of its own interests, within the limits of its own abilities and with the encouragement of all who may be in position to offer assistance. As a society of science teachers charged with a rational development of the thinking and habits of a group of won-world leaders we ask no favors other than an equal opportunity with others to make our contribution to happy wholesome living in the ways in which experience and training indicate the greatest promise lies.

E. Laurence Palmer

THE INSTITUTE OF RADIOBIOLOGY AND BIOPHYSICS

As a further outgrowth of its work on the atomic bomb the University of Chicago has established an institute for applying the results of nuclear physics research to such problems as cancer, heredity, and the aging process, Chancellor Robert M. Hutchins announced recently. The institute, to be known as *The Institute of Radiobiology and Biophysics,* also will seek to perfect techniques for the protection of workers using radioactive materials. This need has been emphasized by the work on the atomic bomb and by the prospect of an increasing use of such materials in industry.

The institute, to be a part of the division of biological sciences at the university, will be headed by Professor Raymond E. Zirkle, a botanist who has specialized in the effect of radiations on living organisms. Professor Zirkle, a native of Springfield, Illinois, where he was born in 1902, came to the University of Chicago as a member of its war research staff in 1942. Educated at the University of Missouri, he has engaged in research and teaching at Missouri, the University of Pennsylvania, Bryn Mawr, and Indiana University.

Members of the new institute will work in close cooperation with those of the Institute of Nuclear Studies already founded at the University of Chicago. Establishment of the new institute is part of the university's plan to further fundamental research in fields which went underground or were neglected during the war.

In commenting on Chancellor Hutchins' announcement, Dr. Reuben G. Gustavson, eminent biochemist and vice-president of the university, said:

"The studies in nuclear physics have revealed many types of radiation, some of which can be produced by new methods which allow accurate control. These new tools are keys with which to open the secrets of our physical and biological worlds. These tools are dangerous to work with, and man has to learn how to protect himself while using them.

"The application of these radiations to living tissues, organisms and biological systems is in its infancy. We can make new attacks on disease. For example, science now knows some two hundred chemical compounds which cause cancer. By replacing the normal atoms in these compounds with radioactive atoms of the same elements, these compounds can be followed in the animal body by a tracer method, and the methods by which they produce cancer may possibly be discovered."

The action of drugs also can be followed by this method. Common elements made radioactive by new methods can be incorporated into hormones, vitamins, and foods also, he added. Such problems as just how sugars and fats are burned within the body may be solved for the first time by this "tracer" method, he said.

Using these methods to probe deeper into the structure and activities of the living cell, scientists may also throw new light on heredity in plants and animals and the processes by which living organisms grow old.

WALKER PRIZES IN NATURAL HISTORY

Two prizes, founded by the late Dr. William Johnson Walker, are offered annually by the Boston Society of Natural History for the two most acceptable papers written

in the English language on a subject chosen by the Board of Trustees of the SOCIETY. The subject for 1946 is Insects.

Prizes: A prize of sixty dollars may be awarded to the author of the best essay. This award may be increased to one hundred dollars, at the discretion of the judges of the contest, in the case of a paper of exceptional merit. A second prize of fifty dollars will be given only if the next best paper seems worthy of the distinction. No prize will be awarded unless the papers submitted are deemed worthy by the judges.

Eligibility: The competition for these prizes is not in any way restricted.

Subject Matter: Each paper must be the result of original and UNPUBLISHED research personally conducted by the author and accompanied by an accurate bibliography and a review of general literature on the subject. All papers must be typewritten and in complete form for publication. Other things being equal, preference may be given papers showing evidence of preparation especially for this competition.

Authorship: Each paper must be anonymous. It must bear a pseudonym placed in a conspicuous place on the first page. A sealed envelope, also inscribed with this pseudonym, must accompany the manuscript. The contents of this envelope will divulge the identity and address of the author. Anything in the essay which shall furnish proof of the identity of the author shall be considered as debarring the paper from competition.

Closing Date: All competitors must submit their work to the *Acting Secretary,* BOSTON SOCIETY OF NATURAL HISTORY, 234 Berkeley Street, Boston, Massachusetts, before May 1, 1946.

The SOCIETY and the judges assume no responsibility for publication of the winning papers. However, it is understood that authors should not publish their papers until after the announcement of the prize awards at the Annual Meeting of the SOCIETY in October 1946.

MARGARET BAKER,
Secretary

AN ABSTRACTING SERVICE FOR HUMAN BIOLOGY

The Trustees of *Biological Abstracts* announce the establishment, beginning in January, 1946, of a new section of *Biological Abstracts*—Section H, specially assembled Abstracts of Human Biology—intended for anthropologists, sociologists, psychologists, neurologists and psychiatrists, students of child development and human welfare, and students of man generally.

The new section will be an assemblage of all abstracts published in *Biological Abstracts* dealing with the broad field of human and social biology. Biological studies on human inheritance, on population and fertility, on endocrine and neurological factors affecting growth, development and human personality, on alcoholism and drug addiction, and on nervous disorders and mental deficiencies, and broad nutritional and epidemiological studies affecting human welfare, are some of the many fields that will be covered. The annual subscription price for the ten abstract issues, plus the complete index of the year's volume of *Biological Abstracts* will be $6.00 ($6.50 outside the United States).

Full information may be obtained by writing to Mr. H. I. Anderson, Business Manager, Biological Abstracts, University of Pennsylvania, Philadelphia 4, Pennsylvania.

THE ST. LOUIS MEETING

The first full scale annual meeting of THE AMERICAN ASSOCIATION OF BIOLOGY TEACHERS since the Dallas Convention of December, 1941, will occur in March. The Cleveland Meeting of September, 1944, enthusiastic and excellent though it was, occurred while the wartime travel and meeting restrictions were still in effect. Final plans for this meeting, as to time and place, were made on October 21, 1945, by secretaries and representatives of sections and affiliates of THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. Miss Helen Trowbridge, Past President of NABT represented our organization.

Since our constitution provides that we meet annually with the AAAS, and since the meeting date was not determined until late in October the official announcement is published herewith, instead of in the October number, as would have been the case had the AAAS convened during the Christmas holidays as has been their custom.

The AAAS convention will take place in St. Louis, March 27–30, 1946. Our meeting will probably convene on Friday, March 29, at 9:30 A.M. and continue through Friday and Saturday, ending with the annual banquet Saturday evening. The representative assembly will hold business sessions on Friday, at which time the reports of the editorial board and of special and standing committees will be submitted. Details of the various programs will be published in the January and February issues.

Kingsley Reservoir, A Desert for Wildfowl*

WALTER KIENER
University of Nebraska, Lincoln, Nebraska

When man, white man, created Lake McConnaughey, better known as Kingsley Reservoir, by means of this large water surface he established a greater attraction for the ducks and other waterfowl but failed to provide the necessary food. To the contrary, he rather reduced the natural food supply and thereby fooled himself as well as the ducks. The reservoir was made to store water for irrigation and power for the good of man, and that was that.

As a Duck Sees It

High, on the wing, the duck's eye catches the twinkling of the large expanse of water and there he will go if it is near feeding or resting time. If he descends to the water for a rest, he finds a haven, for the water is so wide that he is safe from the guns of the hunter. But if he is hungry he probably will get indignant when he sees the bare, sandy beaches with nary a green plant. He may become disgusted, should he happen to come into the vicinity of the inlet where the alternately flooding water has killed all vegetation, including acres of willows and cottonwoods whose bleached stems and branches now give the area a ghostly appearance and an atmosphere of melancholy. So the duck passes on.

As the Hunter Sees It

A hunter knows that where there is no vegetation in or near the water there will be few ducks, and certainly he could not conceal himself on the open sandy beach. On a few places where creeks run into the reservoir some hunters have attempted to erect blinds, but found it very difficult, due to the fluctuating water level, and so the hunter goes elsewhere.

As the Game Commission Sees It

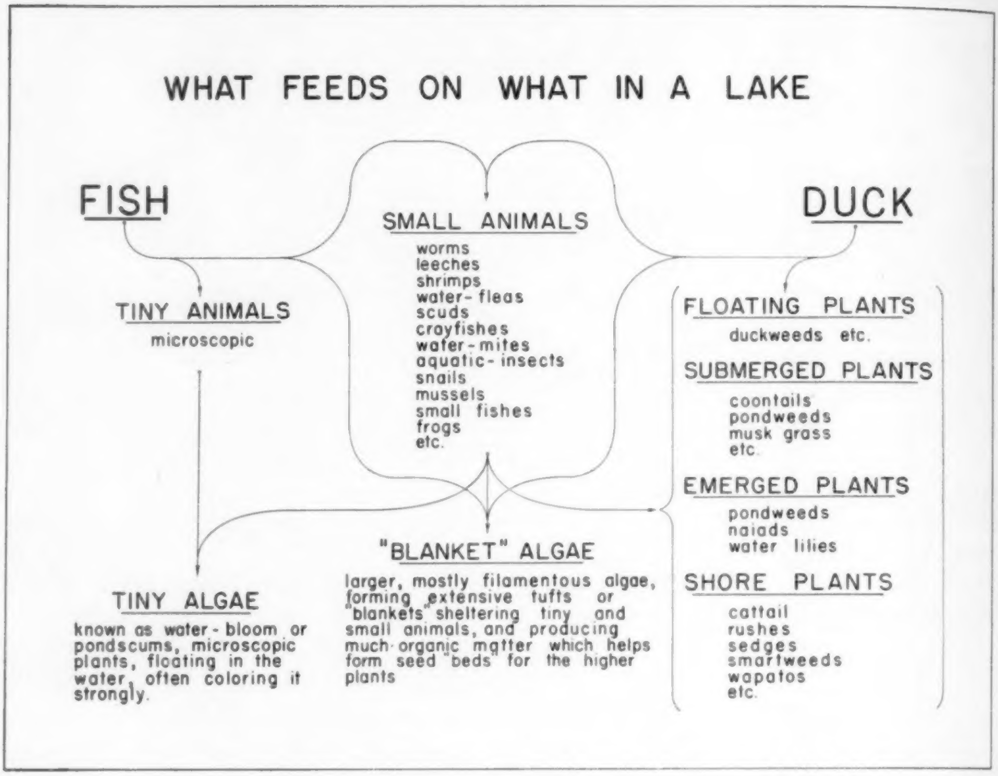
Round and round go stories about Kingsley Reservoir, by far the largest lake in Nebraska. "Why! there should be ducks by millions, they should be breeding there, and the hunters should be flocking there." The same is true in the case of fish. But the stories are all of disappointment. Some say, "Why can't you keep the carp out and put in good fish." It seems a mystery because of lack of coherent information, and so the Game Commission upon investigation sends a plant biologist to make further detailed studies.

As the Plant Biologist Sees It

The biologist realizes that this new lake is a watery environment into which natural agents of dispersal have not as yet brought plant and animal populations characteristic of the older lakes. As long as an adequate plant population has not developed, there will of course be no real animal life, since all animals in the final

* Reprinted, with minor changes, from *Outdoor Nebraska*, Jan. 1944.

EDITOR'S NOTE: A recent letter from Dr. Kiener indicates that during the summer of 1945, fishing was reported as excellent. The causes of this have not been investigated but sudden and sporadic increases in fish populations of new artificial lakes are not uncommon. Dr. Kiener adds that so far as the food plants for wild fowl are concerned, Kingsley Reservoir is still practically a desert.



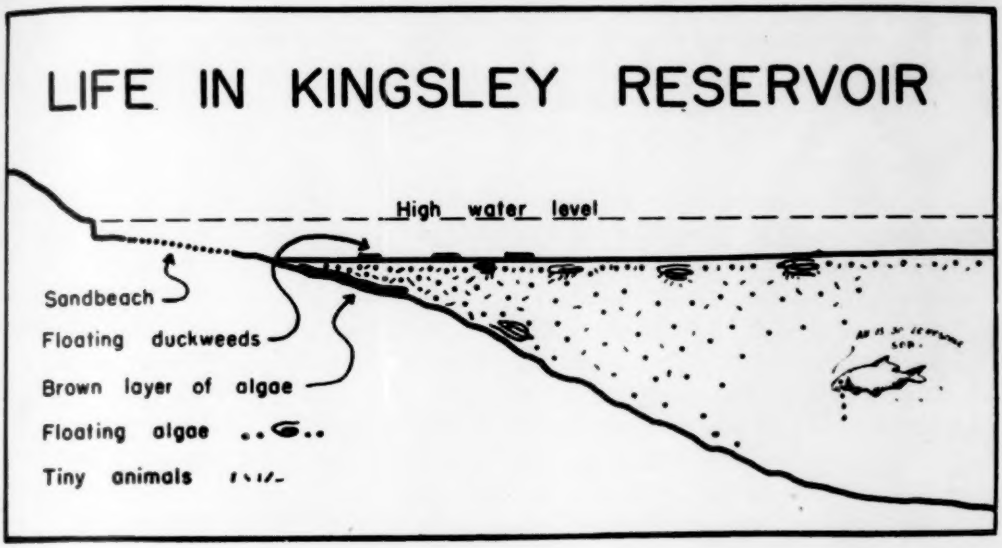
analysis depend on plants for food. Science is often said to be organized common sense, so the scientific investigator proceeds to ascertain facts, compare and analyze them bit by bit, to finally put the whole story together.

Effect of the Lake

When the water began to accumulate above the dam and by and by filled the valley to a length of fifteen miles, it meant death to all plant life which became covered with water. That meant also that for fifteen miles the old river was eliminated with its hundreds of islands and banks which were such good feeding and resting places for the waterfowl. The level of the lake now fluctuates annually to the extent of twenty to thirty feet. This makes the shores of the lake an uncertain habitat for plants as any one point might at one time be high and dry and at another deeply under water. Few, if any plants could survive such a condition. In addition wave action is of considerable strength at times and inhibitive to the growth of most shore plants.

Below Kingsley Reservoir is Lake Ogallala, a regulating reservoir. At the lower end of this lake is a dam which diverts water from the old bed of the North Platte River. Since a large part of the water is now being diverted from the river, many channels of the old bed have become dry, or near dry. As a consequence, fewer aquatic plants are produced and fewer ducks are finding food.

Although the lake is new, there were plants and animals coming in with the water from the North Platte River and the several creeks that now empty into the lake. These plants and animals, however, were mostly the kinds adjusted to life in streams. Inasmuch as physical conditions in a lake are considerably different from those in a stream, the stream organisms did not survive well in the



lake, except the carp. Hence life in the lake is as poor as in a desert.

Future Lake Life Is Probable

It is well known that plant life develops in a certain progressive way from a beginning stage to a more or less stable stage when all the plants and animals present will be relatively balanced among themselves, and with the conditions of their particular environment. Kingsley Lake is now at a beginning stage insofar as plant and animal life is concerned. From accumulated scientific knowledge it seems more than probable that this lake will also develop by and by into a stage of high productivity of plant and animal life.

The fact that the reservoir is built to hold and store river water until needed, results in a seasonably fluctuating waterlevel. Seasonal fluctuation is known for many natural lakes with high productivity. In a natural lake, however, the fluctuation will seldom, if ever, be of such a high degree as it is in the reservoir. The fluctuation forms an impediment to the development of shore vegetation. Certain plants present in natural lakes are expected never to become at home on the shores of the reservoir.

Plant Life Develops By Communities

Plants are social and tend to aggregate to form communities. A plant community shows a certain unity of appearance and composition, and the plants are similar in their demands on the conditions of the place in which they live. In turn the plants have certain effects on the place on which they grow, such as, the formation of humus and other organic waste. On a barren place usually only a few plants can settle; these are the pioneers. From them the first community develops which is then followed by others, each community improving the living place. Along with the plants are animals that form parts of these communities and share their developments. The development goes on till a particular, combined plant and animal community has come about. This community has a more or less stable balance within itself and with the physical conditions of the place in which it lives. As long as these conditions prevail, the stabilized community will hold out, often over long periods of time.

Most generally there are floating, submerged, and shore plant communities with their associated animals. Most plants are rooted and therefore station-

ary. The exception is the floating plant which is moved about by currents, wind, and other agencies.

Because of their ability to float in or on the water these plants are the first to be carried into a new place by running water. Since they have no true roots, they are not directly affected by the lake bottom. The very first of these plants to arrive are the pond-scums, also known as water-bloom and frogspit, but really they are algae.

Algae belong to that group of plants that never produce any flowers, and in which group plants may be so small that it requires a microscope to study them. Though some of these plants are very small they accumulate in numbers to become visible to the unaided eye. They may be so numerous they give the water a green color; or they may form tufts and blankets over the water. Some may form a brown coating on the ground and also on the stems of tumble-weeds blown into the water. These pioneer algae are about the only kinds of plants present in the lake at this time.

With the pond-scums arriving in the lake are also microscopic animals that are almost always associated with the algae. The algae prosper and spread in this new lake and with them the tiny animals which feed on the pond-scums. As the tiny animals prosper, so will those animals which are not so tiny but eat the tiny ones. These in turn will be eaten by still larger ones. It follows, therefore: no plants, no animals.

"Calcining" Specimens

MARY D. ROGICK
College of New Rochelle, New Rochelle, New York

Those who live along the seashore often find on the beaches rocks, empty mollusk shells, wood fragments or other material encrusted or fouled with marine animals. If one does any collecting at all in the littoral or intertidal zone, he is sure to find such encrustations. These may be of many kinds: tunicates, hydroids, worm tubes, barnacles, bryozoa, etc. The ordinary collector would readily recognize most of them except possibly the bryozoa and some of the tunicates. The bryozoa, although as common and abundant as any of the fouling organisms mentioned above, are overlooked because of their extreme flatness which makes them seem a part of the rock or substratum on which they are growing (see Figs. 2 and 3). They form flat patches of various colors (white, pink, orange, yellow, reddish, etc.) on rocks and other substrates. A great many marine (calcareous) bryozoa form delicate rounded colonies from several mm. to several cm. across and less than 1 mm. high. When viewed with a sufficiently high-powered hand lens ($12\times$–$14\times$) or a microscope, using reflected light, an orderly arrangement of the colony individuals may be seen (see Figs. 1 and 4).

The colonies are composed of a large number of box-like calcareous zooecia, neatly arranged and characteristically sculptured, in which live the soft-bodied individuals. The sculpturing or markings on each zooecium are characteristic for that species. The zooecia form an intricate and interesting design that could be studied by not only the Biology but also the Art classes. From an artistic point of view the bryozoa are cer-

tainly one of the most beautiful groups of animals that one can study. They show the colonial mode of growth very nicely.

The above description refers to the calcareous forms which are seldom studied in college courses. Bryozoans usually studied in college and referred to in elementary college texts are of the chitinous or soft-bodied species like *Bugula, Plumatella, Pectinatella,* etc. These species are far less beautiful than the more abundant calcareous forms. The calcareous forms have been very much neglected although they are just as interesting and far more beautiful than the softer, chitinous forms.

Materials Needed

Collecting and preparing the colonies for study is simple. Colonies grow on the underside of rocks in the intertidal or below low tide zones, as well as on dead univalve or bivalve mollusk shells and other substrates. The bryozoan growth may be so luxuriant that in some places bryozoa may form rock-like clumps or nodules composed of layer upon layer of colonies. The shell, rock or seaweed bearing the bryozoan colonies should be brought into the laboratory. It is not practical nor desirable to scrape the colony off its substratum because too great damage is done to the colony. It is much easier to burn off the colony. This burning or "calcining" process is applicable only to the calcareous but not to the chitinous bryozoa.

If one does not live near the seashore calcareous bryozoan specimens growing on rocks, sea shells or seaweeds can be obtained from the supply department of any large marine biological laboratory since bryozoa are one of the most common fouling organisms that occur in our coastal waters.

After collection these specimens need not be kept in sea water, unless one wishes to study the behavior of the soft internal individuals within the calcareous exoskeleton. The specimens should be carefully washed in distilled or tap water to remove any debris or salts which might have crystallized upon the specimens. These specimens should be set aside somewhere in the laboratory or out in the sun to dry until one is ready to "calcine" them. The dry specimens will keep for years without any special care, so those ordered during one year and unused at that time can be saved for subsequent semesters or years.

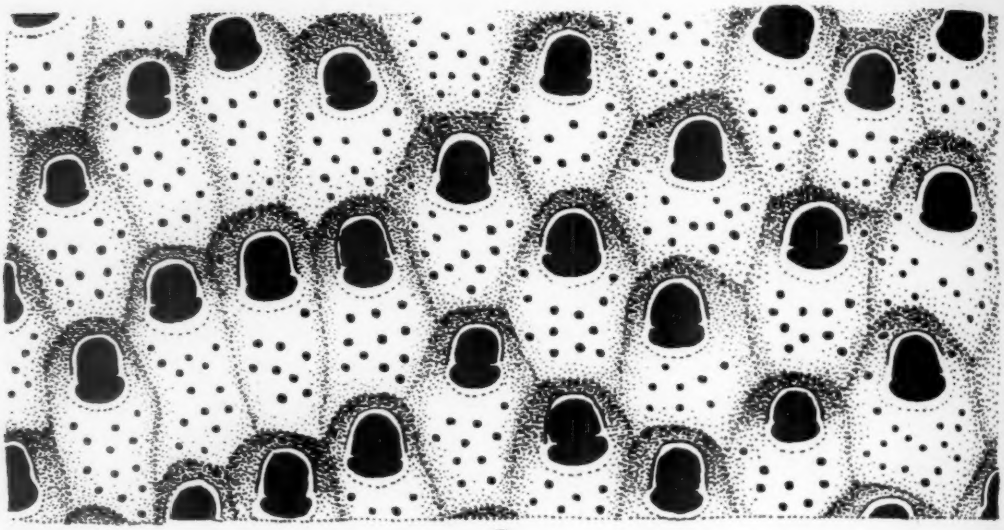
The supplies needed for this "calcining" exercise are as follows:

1. A 10- or 11-inch metal or glass blowpipe. The former is preferable from the standpoint of durability. However, the glass blowpipe is almost equally satisfactory from the standpoint of performance. It can be made by the instructor or students from ordinary soft glass tubing heated and drawn out at one end to a small bore about 1 mm. in diameter (inside measurements), while the other end may be 8 mm. in diameter. The narrow end should be curved at about a 120° angle within an inch or 2 of the tip.
2. An alcohol lamp or bunsen burner and matches.
3. An old teaspoon or tablespoon for holding specimens too small to be held in the hand during the "calcining" process.
4. A binocular dissecting microscope or a compound microscope with 20 × to 100 × magnification.
5. An ordinary goose-neck table lamp or some type of lamp to provide reflected lighting since the colonies and their substrates are opaque.
6. Rather thick balsam or mucilage with a glass rod for a dropper. Balsam is better than mucilage or glue because it shrinks far less in drying than do the others.
7. Clean dry specimens of calcareous bryozoa.
8. Miscellaneous supplies like forceps, scalpel, dissecting needle, small brush, glass slides, slide labels, slide box, etc.

All needed supplies should be on hand before one begins work.

Purpose of Exercise

The purpose of the burning or "calcining" procedure is: (a) to lift the



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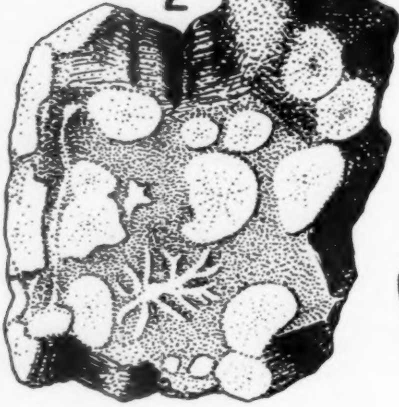

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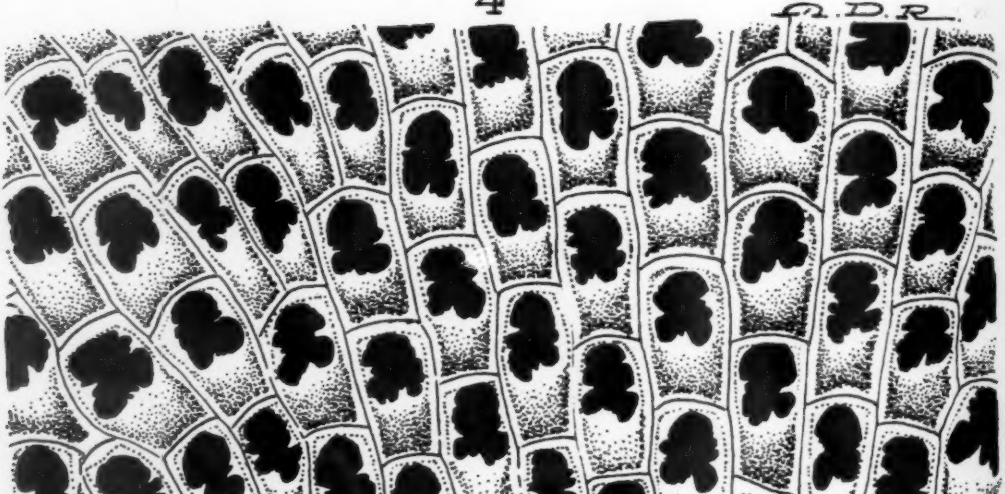

firmly attached bryozoan colonies from their rock or shell substrata without doing too much damage to the colonial skeleton; (b) to prepare permanent slides of the skeletons of calcareous bryozoa either for the subsequent study by the Biology or Art classes or for the departmental museum collection; (c) to burn off the organic matter which sometimes obscures the diagnostic features of the colonies, thus rendering them more suitable for detailed study and (d) to awaken interest among students and others in a very beautiful and widely distributed group of animals whose importance as fouling organisms is receiving increasing recognition.

Figure 1. Detail of a portion of a dead Bryozoan colony of *Cryptosula pallasiana*, collected along the shore at Kettle Cove, Naushon Island, Buzzards Bay, Mass., on Aug. 17, 1939. Drawn with the aid of a camera lucida, a 5× ocular and a 4× objective. Each black bell-shaped aperture is the opening into the box-like calcareous skeletal compartment (the zooecium) in which a soft-bodied individual is present in life.

Figure 2. Rock fragment, natural size, on which are growing a number of calcareous bryozoan colonies. Collected at Great Harbor, Woods Hole, Mass., on Aug. 10, 1945. The colonies are shown as white patches on the dark rock. There are at least 2 different species represented here. The delicate dendritic or branching form is one species. The rounded or more circular colonies belong to other species.

Figure 3. A mussel (*Mytilus*) shell, natural size, covered by a number of bryozoan colonies of different ages. The colonies are the rounded white patches. They may be on the outside or the inside of the shell. The biggest colony is the one from which Fig. 1 above was drawn.

Figure 4. Detail of a bryozoan colony of *Acanthodesia tenuis* which was collected at Stony Beach, Woods Hole, Mass., on Aug. 4, 1944. Drawn with the aid of a camera lucida, a 5× ocular and 4× objective. Note the different shape of the apertures and the more rectangular shape of the zooecia of this species as compared with the species pictured in Fig. 1. Shape of the apertures is one of the very important diagnostic characters in calcareous bryozoa.

"Calcining" leaves the calcareous skeleton of the colony a clean, brilliantly white tracery with many black perforations where living tissue was present before. Calcining is more commonly used in the fields of Inorganic Chemistry and Metallurgy than in Biology.

The writer is deeply indebted to Dr. R. C. Osburn, formerly of Ohio State University and now of the University of Southern California, for showing her how to prepare bryozoan specimens in this manner in 1932 and to the Marine Biological Laboratory at Woods Hole, Mass., for collecting and laboratory facilities within recent years.

"Calcining" Procedure

Select an encrusted rock or shell which has on it a clean dry colony. If the shell or rock fragment is small it should be placed in a spoon; if large, it can be held in the hand while being "calcined." One hand should hold the specimen while the other hand steadies the blowpipe, as in Fig. 5.

Figure 5. A student holding a rock on which there is a bryozoan colony toward which a flame is directed by the blowpipe. Around the bunsen burner are slides, slide labels, a spoon for holding small specimens which are to be "calcined," balsam bottle and miscellaneous instruments. If permanent slides are not desired the balsam may be omitted from the procedure.

Bring the specimen near the lit burner or alcohol lamp. Have the small-bored end of the blowpipe a short distance from the flame. Blow the flame directly on to the bryozoan colony, focusing it around the edges of the colony first, then in the center. The rock or shell may chip during the burning. The colony may do the same or it may lift right off its substratum.

The colony while being "calcined" will turn black at first, then may become red hot, then turn white. Do not burn the colony until it becomes a crumbly snowy-white amorphous mass because by that time the burning will have gone too far and the colony will be useless for any diagnostic study. The term "calcining" generally implies burning to that stage but for bryozoan work that is disastrous and will reduce the colonies to a fine powder. That is why the term has been enclosed in quotes throughout this entire article. Continue the burning only so long as necessary, i.e., when some white begins to show and so long as the colony seems to retain its fine diagnostic pattern without any crumbling or flakiness of surface. Place the colony under the microscope frequently during the calcining process so that calcining may be stopped before it has progressed too far.

With a suitable instrument (dissecting needle, scalpel, forceps, brush, etc.) lift up the colony which has just been "calcined," place it on a slide on which a drop of balsam or glue had just been placed. The colony should be set, attached side down, on this drop of balsam. Allow preparation to harden for a day or two before permitting students to use the slides. The slides should remain horizontal during the hardening period. No cover slip is needed over this preparation.

It is an excellent and practical idea to mount alongside the "calcined" specimen another colony fragment of the same species, uncalcined, for comparison. Moreover, the uncalcined specimen will very likely last longer over a period of years than the "calcined" one but it is harder to study because the organic material representing the fleshy parts of the colony may obscure some of the fine skeletal detail which is important in identification. The calcareous forms are classified largely on the appearance of their exoskeleton.

Books

Conrad, Henry S. *How to Know the Mosses.* Wm. C. Brown Company, Dubuque, Iowa. 166 pp. 1944. Cloth $2.50. Spiral Bound $1.50.

How to Know the Mosses is another book in the "Picture-key Nature Series" which provides a guide for determining the identity of many mosses and liverworts. The author has simplified the identification of mosses and liverworts through selection of the most distinctive recognition characters, which are pictured adjacent to the verbal descriptions. The book will be useful to those who have a limited knowledge of the subject since it includes suggestions and aids for the study of bryophytes. In other words, the hobbyist will find the picture-key most helpful while the bryologist will demand a more extensive description than is offered.

The keys are to genera rather than to families; and, in order to help the student understand the family relationships, a systematic list of the mosses and liverworts is included.

Dr. Conrad lists *Mosses with Hand Lens and Microscope* and *Moss Flora of North America* by A. J. Grout as indispensable. One may conclude from this that the author does not consider *How to Know the Mosses* as a book to replace the more extensive works, but rather as one which will help create interest in bryophytes.

M. A. Hintz

Science Year Book of 1945, edited by John D. Ratcliff, Doubleday, Doran and Co., 14 West 49th Street, New York, N. Y. xxvii + 224 pp. Price $2.50.

The Year Book of Science contains articles reprinted from some of our best maga-

zines. In the introduction, the editor, in a clever way, discusses a number of scientific topics not mentioned in the text and corrects the somewhat prevalent idea that science is an enemy of man and calls attention to the fact that it is a "force which can set him free." The book is divided into four major parts: I, Medicine; II, Physics and Chemistry; III, Aviation; and IV, Miscellaneous. The articles selected are in general excellent and present the most recent developments in the field of science. The various topics are written in a style which will appeal to the layman. The outstanding articles are—Part I: "Penicillin: Miracle Drug," (from *Time*), "The Miracle Of Blood" (from *Hygeia* and *Reader's Digest*), and the "Wonder Metal" --Tantalum (from *Hygeia*); Part II: "The Electron in Industry" (from *New York Times Magazine*), "Electrons in Medicine" (from *Hygeia*) and "DDT On The Farm" (from *Country Gentleman*); Part III: "Rocket Ship" (from *Collier's*); and Part IV: "End of Our Petroleum" (from *The Saturday Evening Post*) and "Arctic Oil" (from *Harper's*). The last two articles might well have been deleted, because of their theoretical tendencies. Since *Science Year Book of 1945* not only is entertaining reading, but also conveys to the reader accurate information on the latest developments in the field of science, it should be included in the reading of many people.

M. A. Hintz,
South Milwaukee High School,
South Milwaukee, Wisconsin

Wodehouse, Roger P. *Hayfever Plants.* Waltham, Mass., The Chronica Botanica Co.; New York City, G. E. Stechert and Co. xix + 245 pp. illus. 1945. $4.75.

The study of hayfever falls into two fields, the clinical and the botanical. Each is so broad of scope and widely differing in character that to excel in one is almost to preclude the possibility of excelling in the other. The past twenty-five years has seen the accomplishments of much excellent work in both fields, with a preponderance of the work being in the clinical field.

Dr. Wodehouse, Associate Director of Research in Allergy, Lederle Laboratories, has brought together in this book all the scattered facts of the botanical field and has interpreted them in terms of their clinical significance. Here are described all the plants known to cause hayfever, most of those reasonable suspected of doing so, and many which have been mentioned in hayfever literature, possible wrongly. In the excellent plant descriptions the author has not attempted to define the species beyond pointing out a few of the salient features which may readily be used and most easily retained in memory. The plants are presented in the sequence of Engler and Prantl in their *Naturliche Pflanzenfamilien.* Usage and expediency has been the choice of botanical names. Forty-nine excellent pages have been given to regional surveys with pertinent information and figures. The book closes with a glossary, bibliography and an author and general index, all of which makes for a useful, readable, reference book on hayfever.

Charles C. Herbst,
Beverly Hills High School,
Beverly Hills, California

Dean, H. L. *Laboratory Exercises, Biology of Plants.* 2nd ed. Wm. C. Brown Co., Dubuque, Iowa. 244 pp. illus. 1944. Planographed. $1.75.

Independent, intensive study unhampered by note-taking or drawing is the keynote of *Laboratory Exercises, Biology of Plants,* by H. L. Dean. The exercises are those ordinarily studied in beginning college botany. The drawings are clear. The directions are specially suited for the author's classes.

Brother H. Charles, F.S.C.,
Saint Mary's College,
Winona, Minnesota

BIOLOGY SECTION

Indiana State Teachers' Association

The regular annual meeting of the biology section of The Indiana State Teachers' Association was held October 25 in George Washington High School, Indianapolis.

O. B. Christy, Ball State Teachers College, introduced the speaker, Dr. Webb, of George Peabody Teachers College, who discussed the responsibilities and opportunities of biology teachers in preparing interested young men and women for places in the "Biological Age" which lies just ahead.

A. T. Guard, Purdue University, reported on the study of the state curriculum in biology and asked that teachers send in suggestions immediately.

Howard H. Michaud, Purdue, reported on the Conservation Units, and announced that the bulletins may be obtained from the office of T. C. Malan, State House, Indianapolis. Mr. Michaud also reported on the plan for the Indiana Outdoor Conservation Camp for teachers, to be held at Versailles Park next summer.

S. A. Rifenburgh, Purdue, referred to the State Testing Program and requested that teachers send questions for the second semester biology test.

President Whitaker of The National Association of Biology Teacers reported on the Chicago meeting of *The Representative*

Assembly of the Association in October. He explained some of the activities of the Association and also made announcements concerning the spring meeting.

KATHRYN E. COULTER, *Secretary*
EDNA BANTA, *President*